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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,378	01/10/2002	Frank W. Harris	UA 335	1584

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Ray L Weber
Renner Kenner Greive Bobak Taylor & Weber
Fourth Floor First National Tower
Akron, OH 44308-1456

EXAMINER

BISSETT, MELANIE D

ART UNIT

PAPER NUMBER

1711

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant(s)

09/890,378

Applicant(s)

HARRIS ET AL.

Examiner

Melanie D. Bissett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 12-19 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 8-11 and 20-22 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 13 and 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 13 recites "selected from the group consisting comprising...." It is unclear whether the applicant intends to claim a group consisting of the elements or comprising the elements. However, since a proper Markush group recites a closed set, it is the examiner's position to treat the claim as reading "selected from the group consisting of...."

4. Claim 23 recites the limitation "the organic solvent" in line 11 following formula IV. There is insufficient antecedent basis for this limitation in the claim. It is the examiner's position to treat the claim as reading "dispersed within an organic solvent...."

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 6-7, 12-13, and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Hougham et al.

7. Hougham discloses low dielectric constant polyimides for use on electrical devices such as capacitors, semiconductors, and integrated circuits (abstract; col. 1 lines 26-35). One noted combination of monomers matches the applicant's formulas (I or IV) and III to form a polyimide of 6FDA-PFMB (col. 11 lines 38-58; Table 2). Such a polymer has a dry dielectric constant of 2.71 (Table 3). Because the term *about 2.7* encompasses values slightly over 2.7 and allowing experimental error, it is the examiner's position that the cited dielectric constant meets the applicant's limitation of *less than about 2.7*.

8. Claims 12 and 17-19 is rejected under 35 U.S.C. 102(b) as being anticipated by Harris et al.

9. Harris discloses negative birefringent films useful in liquid crystal displays, where aromatic dianhydrides and diamines are used. An especially preferred dianhydride is one fitting the applicant's formula II (col. 24 lines 7-12). Examples show polyimides of 6FDA-TFMB (example 5) and TFBPDA-TFMB (example 33), where the polyimide based on TFBPDA has a coefficient of thermal expansion of 18.8×10^{-6} . The birefringent films are used in liquid crystal articles having electrodes (col. 66 lines 36-45; col. 67 lines 39-46).

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10. Regarding the dielectric constant limitations, it is noted that the TFBPDA-TFMB polymer of the reference uses the same reactants and reaction method as those employed by the applicant. It is therefore the examiner's position that the polymers of Harris' invention would inherently possess the applicant's claimed dielectric constants.

11. Claims 1, 3-7, 12, and 14-18 are rejected under 35 U.S.C. 102(a) as being anticipated by Hitachi as evidenced by Hougham et al. The examiner refers to the English equivalent of Hitachi, Ido et al. (US 6,229,949 B1).

12. Ido discloses an optical integrated circuit having a metallic base electrode, a polymer buffer layer, and a fluorinated polymer clad layer (col. 2 line 64-col. 3 line 18). Preferred monomers include 6FDA and TFDB (col. 5). The reference teaches a 10- μ m clad layer of 6FDA-TFDB and a 7- μ m layer of 6FDA/PMDA-TFDB. Hougham teaches that the dielectric constant of 6FDA-TFDB is 2.71. Because the term *about 2.7* encompasses values slightly over 2.7 and allowing experimental error, it is the examiner's position that the cited dielectric constant meets the applicant's limitation of *less than about 2.7*. Therefore, because Hougham and Ido both form the same polymer via polyamic acid, it is the examiner's position that the materials of Ido and Hougham would have the same dielectric constant.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 2 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hougham et al. in view of Gardner et al.

15. Hougham applies as above, teaching the formation of integrated circuits and integrated circuit packages but failing to specify the formation of microprocessors.

Gardner teaches that integrated circuits may be used together to form microprocessors or used together to form a microprocessor/memory chip combination (col. 8 line 64-col. 9 line 20). These articles are used in computer applications. The integrated circuits of Gardner's invention include at least one layer of low dielectric material, including fluoropolyimide dielectric materials (col. 5 lines 44-67). Thus, it is the examiner's position that it would have been prima facie obvious to use the dielectric materials of Hougham's invention to form microprocessors with the motivation of forming a microprocessor article for a computer having improved low dielectric character.

16. Further, Hougham teaches dissolving polyamic acids in solvents, including DMAc and NMP, casting and drying a film, heating the film to initiate ring closure and formation of the polyimide, redissolving the film, and cycling the process until a desired molecular weight is achieved (Figure 4; col. 4 lines 13-42). Also, the formation of integrated circuits is mentioned. However, the reference does not specifically indicate casting a

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dissolved polyimide onto a substrate to form an integrated circuit. Gardner teaches methods for forming an integrated circuit, where the low dielectric materials are deposited or spin-coated onto the substrate (col. 5 lines 44-67). Because Hougham already cycles a process of dissolving a polyimide/polyamic acid, casting the solution onto a substrate, and heating the material to increase molecular weight, it is the examiner's position that it would have been prima facie obvious to spin-coat the solution directly onto the integrated circuit substrate to adhere the dielectric material to the substrate from a solution state without additional processing steps. Following the casting procedure of Hougham, the final casting onto an integrated circuit would be heated to further increase molecular weight.

17. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hitachi in view of Gardner et al.

18. Ido applies as above, teaching the formation of integrated circuits but failing to specify the formation of microprocessors. Gardner teaches that integrated circuits may be used together to form microprocessors or used together to form a microprocessor/memory chip combination (col. 8 line 64-col. 9 line 20). These articles are used in computer applications. The integrated circuits of Gardner's invention include at least one layer of low dielectric material, including fluoropolyimide dielectric materials (col. 5 lines 44-67). Thus, it is the examiner's position that it would have been prima facie obvious to use the dielectric materials of Ido's invention to form

microprocessors with the motivation of forming a microprocessor article for a computer having improved low dielectric character.

19. Claims 3-5 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hougham et al. in view of Mukai et al.

20. Hougham applies as above, teaching the use of polyimide dielectric materials for integrated circuits but failing to teach the thickness of the material on the integrated circuit substrate. Mukai teaches semiconductor devices using polyimide insulating materials, where a thickness of at least 10 μm is essential to protecting the article from alpha particles (abstract; col. 2 lines 47-68). It is the examiner's position, therefore, that it would have been prima facie obvious to apply Hougham's polyimides at thicknesses of at least 10 μm to the integrated circuits to improve protection from alpha particles.

Allowable Subject Matter

21. Claims 8-11 and 20-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The closest prior art, Hougham et al. (US 5,324,813 A), discloses low dielectric constant polyimides for use on electrical devices such as capacitors, semiconductors, and integrated circuits. The polyimide materials fit the applicant's formulas (I or IV) and III. However, the reference teaches a dielectric constant for this polymer of 2.71. The reference does not teach forming the polymer to have a dielectric constant of less than

about 2.5 or teach the applicant's claimed thermal expansion coefficients. It is therefore the examiner's position that the applicant's claimed dielectric constant of less than about 2.5 and the applicant's claimed thermal expansion coefficients provide a novel and unobvious step over the prior art integrated circuits.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie D. Bissett whose telephone number is (703) 308-6539. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (703) 308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

mdb
July 22, 2003



James J. Seidleck
Supervisory Patent Examiner
Technology Center 1700